United States Coast Guard



MACHINERY INSPECTION BOOK

Name of Vessel	
Official Number	Class
Date Completed	
Location	
Vessel Built in Compl	iance with SOLAS: 60 74 74/78 NA
Inspection Type	
☐ Inspection for Certification (COI)	☐ Reinspection O First
☐ Annual	O Second Passenger vessels only
☐ Periodic	O Third
□ Other	
Inspectors	
1	3
2	4

Total Time Spent Per Activity:

Regular Personnel (Active Duty)					
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI		

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS

Reserve Personnel					
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI		

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS

Auxiliary Resources			
TOTAL BOAT HOURS	TOTAL AIRCRAFT HOURS		

Conversions:

Dista	nce a	and E	nergy								
Kilowa	tts (kW	<i>'</i>)	Х	1	.341		=	Hors	sepower ((hp)	
Feet (f	t)		X	3	.281		=	Mete	ers (m)		
Long T	on (LT	.)	X	.9	8421		=	Met	ric Ton (t)		
Liqui	d (No	OTE: V	alues are appr	oximat	e.)						
Liqu	ıid		bbl/LT		ı	n³/t		bb	l/m³		bbl/t
Freshv	vater		6.40		1	1.00		6.	29		6.29
Saltwa	ter		6.24			975		6.	13		5.98
Heavy	Oil		6.77		1	1.06		6.	66		7.06
DFM			6.60		1	1.19		7.	48		8.91
Lube C	Dil		7.66		1	1.20		7.	54		9.05
Weig	ht										
1 Long	Ton	=	2240 lbs		1	Metric	Ton	=	2204 lbs	3	
1 Shor	t Ton	=	2000 lbs		1	Cubic	Foot	=	7.48 gal		
1 Barre	el (oil)	=	5.61 ft = 42 ga 6.29 m ³	l =	1	psi		=	.06895 E of water		2.3106 ft
Temp	oerati	ure:	-ahrenheit =	: Cels	sius	(°F = 9	/5 °C +	+ 32	and °C =	= 5/9	(°F – 32))
0	=	-17.8	8	0	=	26.7			200	=	93.3
32	=	0	9	0	=	32.2			250	=	121.1
40	=	4.4	10	00	=	37.8			300	=	148.9
50	=	10.0	11	0	=	43.3			400	=	204.4
60	=	15.6	12	20	=	48.9			500	=	260
70	=	21.1	15	50	=	65.6			1000	=	537.8
Press	sure:	Bars	= Pounds p	er sq	luare	inch					
1 Bar	=	14.5	psi 5 E	Bars	=	72.5	osi		9 Bars	=	130.5 psi
2 bars	=	29.0	psi 6 E	Bars	=	ا 87.0	osi		10 Bars	=	145.0 psi
3 Bars	=	43.5	psi 7 E	Bars	=	101.5	psi				
4 Bars	=	58.0	psi 8 E	Bars	=	116.0	psi				

Notes:			

Use of Machinery Inspection Book:

This inspection book is intended to be used as a job aid by Coast Guard marine inspectors during machinery inspections of U.S. flagged vessels. The lists contained within this book are not intended to limit the inspection. Each marine inspector should determine the depth of inspection necessary. A checked box should be a running record of what has been inspected. It does not imply that the entire system has been inspected or that all or any items are in full compliance. This job aid does not constitute part of the official inspection record.

This document does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, CFRs, NVICs, or any locally produced cite guides for specific regulatory references. Not all items in this book are applicable to all vessels or types of propulsion systems.

NOTE: Guidance on how to conduct machinery inspections of U.S. flagged vessels can be found in Marine Safety Manual (MSM) Volume II: Inspection of Vessels for Certification. All MSM cites listed in this book refer to MSM Volume II unless otherwise indicated.

Pre-inspection Items:

ems: Post-inspection Items:

- Review MISLE records.
- Obtain copies of Certificates to be issued.
- Issue/endorse certificates as appropriate.
- Complete MISLE entries.
 - Activity Type
 - Team Members
 - Vessel Details
 - Fleet of Resp
 - Deficiencies
 - Certificates
- Initiate Notice of Violation (NOV) if necessary.

Table of Contents: Section 1: Inspection Items Boilers 1 Diesels 6 Pressure Vessels 7 Auxiliary Machinery 7 Electrical Systems 8 Firefighting Equipment 11 Watertight Integrity 12 Pollution Prevention 13 Marine Sanitation Devices 13 Miscellaneous 14 Section 2: Appendices Recommended US Vessel Deficiency Procedures 15

Deficiency	Req't. Issued/ Date Completed
	· ·
	<u> </u>
	<u> </u>
Notes:	

Deficiency Summary Worksheet:

Name of Vessel	VIN
Deficiency	Req't. Issued/ Date Completed

Section 1: Inspection Items

Boilers:

- □ Propulsion machinery
 Safety devices
 46 CFR 58.05
 SOLAS 74/78 II-1/27
 - Foundations
 - Guards
 - Controls
- Propulsion and auxiliary boilers
 - Shells or drums

 Headers

 Superheater

 Blow off piping and valves

 46 CFR 52.01-2

 46 CFR 52.01-35

 SOLAS 74/78 II-1/32

 MSM Vol II

 46 CFR 52.15-5
 - Tubes or flues
 - Furnaces
 - Soot blowers
 - Economizers
 - Combustion chambers
 - Refractory
 - Casing and insulation
 - Uptakes
 - Air preheaters
 - Forced draft blowers
 - Foundations
 - Gauges
 - Water level indicators

46 CFR 52.01-110

46 CFR 56.50-40

□ Periodic test and inspection of boilers in accordance with 46 CFR Table 61.05-10

Boiler ID Number	Date Hydrostatically Tested	Date Mountings Opened	Date Mountings Removed and Studs Examined	Fireside	Waterside	External

Notes:	

Testing of Boiler Safety Valve 46 CFR 52.01-120

	40 OF IN 52.01-120					
Step	Action	D/S	S/S	S/P		
1	Determine MAWP of boiler psi					
2	Record pressure setting stamped on each valve.	psi	psi	psi		
3	Observe opening and closing of valves and record lift and seating pressures of each valve. 3a. Lift pressure	psi	psi	psi		
	3b. Seating pressure	psi	psi	psi		
	warning: NEVER allow test pressure to be greated pressure is above MAWP, the valve must be adjusted continues. NOTE: Safety valves must be tested in highest-to-lod D/S-S/S-S/P. This avoids the risk of damaging a valuating a gag on it after it has been tested.	ed or replace	ed before te	st pically		
4	Ensure Step 3 pressures are within acceptable limits (± 5%) of stamped pressure. Use the following calculations. 4a. Step 2 (stamped pressure) x .05 4b. Step 2 (stamped pressure) – 4a (-5%)	psi	psi	psi		
	4c. Step 2 (stamped pressure) + 4a (+5%)	psi	psi	psi		
	IMPORTANT: Step 3 (lift pressure) must be between and 4c. If NOT, safety valve lift pressure MUST be					
5	Record superheater pressure drop value from boiler manual.		psi	psi		
6	Ensure S/S and S/P lift pressures (from Step 3) are ≤ pressures recorded in 6b .					
	 6a. Step 5 (superheater pressure drop) + 5 psi 6b. Step 3a (D/S pressure) - 6a pressure 		psi psi	psi psi		
	IMPORTANT: If Step 3a (S/S and S/P) is NOT \leq 6b MUST be adjusted.	o, S/S and S	S/P lift press	ures		
7	Determine blowdown and ensure it is between 2% and 4% of lift pressure for each valve. Use the following calculations.					
	 7a. 3a pressure - 3b pressure = blowdown 7b. 3a pressure x .02 (2%) 7c. 3a pressure x .04 (4%) 	psi psi psi	psi psi psi	psi psi psi		
	IMPORTANT: If 7a (blowdown) is not between 7b and 7c, blowdown setting MUS be adjusted within specified limits.					
8	After hand-relieving gear is reinstalled, observe each valve as it is hand-relieved from the fireroom or engineroom floor (46 CFR 52.01-120(d)(2)).					

D/S = Drum Safety Valve **S/S** = Superheater Safety Valve **S/P** = Superheater Pilot Valve

Section 2: Appendices

Recommended US Vessel Deficiency Procedures:

Step	Action						
1	Identify deficiency.						
2	Inform vessel representative.						
3	Record on the <i>Deficiency Summary Worksheet</i> (next page).						
4	If deficiency is corrected prior to	If deficiency is corrected prior to end of inspection, go to Step 7.					
5	If deficiency is unable to be corrected prior to end of inspection, issue CG-835 in accordance with table below.						
	IF deficiency:	THEN issue CG-835:					
	Does NOT immediately impact crew/passenger safety, hull seaworthiness, or the environment, e.g., • Missing placards	That provides a specific time for correcting deficiency, e.g., • "X" number of days					
	Allows vessel operations to be MODIFIED to meet less stringent requirements, e.g., • Automation defect	That restricts operation of vessel to meet current vessel conditions, e.g., • Increased crew					
	DOES immediately impact crew/passenger safety, hull seaworthiness, or the environment, and cannot be modified to meet less stringent requirements, e.g., • Missing or defective firefighting equipment	That requires the deficiency to be corrected prior to operating vessel ("NO SAIL" item), e.g., • Prior to carrying passengers • Prior to carrying cargo					
	Fotor CC 925 data in MICL 5						
6	Enter CG-835 data in MISLE.	0.16					
7	Initiate Report of Violation (ROV) if necessary.					

	Installation	33 CFR 159.57		
	OperationVentilationWiring and pipingMaintenance	MSM Vol. IV		
	 Placard posted Safety Accessibility to parts requiring routine servicing Manufacturer's instructions available 	33 CFR 159.59		
Mi	scellaneous:			
	Liquefied petroleum gases for cooking and heating	46 CFR 61.15-10		
	 Approved type Cylinder – Test dates – Stowage Safety relief device Regulators Piping and fittings Location Tank tops, bilges, cofferdams, and bilge wells 			
	Sea suctions and overboard discharges	MSM Vol. II		
	Nonmetallic expansion joints • External exam • 10-year service replacement	46 CFR 61.15-12 MSM Vol. II		
	Means of escape	46 CFR 32.01-1 46 CFR 72.10-5 46 CFR 92.10-5		
	 Machinery space maintenance Non-conformity record keeping 	33 CFR Part 96		
Not	Documents and reports es:			

Safe	ty valves	46 CFR 52.01-120
•	Relieving gear	MSM Vol. IV
•	Escape pipes	46 CFR 56.50-25
•	Drains	10 01 11 00:00 20

• Drains		10 01 11 00.00 20
Boiler	Date Set and Sealed	Pressure Setting
Superheater safety valv	res	46 CFR 52.01-120
Boiler	Date Set and Sealed	Pressure Setting

Boiler	Date Set and Sealed	Pressure Setting

	Auto	omation	46 CFR Part 62
	•	Reduced manning	SOLAS 74/78 II-1/46-54
		☐ Yes	MSM Vol. IV
		☐ No	NVIC 1-69 NVIC 7-73
	•	Approved test procedure	NVIC 6-84
	•	Satisfactory test	46 CFR 62.50
	•	Reviewed logs/records	46 CFR 62.30-10
	•	Interviewed personnel	
Note	es:		

	Fusible plugs	46 CFR 52.01-50	Pollution Prevention:	
ExaminedRenewed at this inspection		46 CFR Table 61.05-10 MSM Vol. IV	NOTE: Guidance for inspecting pollution prevention items is a Chapter 31.	letailed in MSM Volume II,
			 Oil record book maintained and submitted 	33 CFR 151.25
	High pressure steam piping	46 CFR 52.01-105	City water concreting againment	MARPOL Ax. I/20
	Steam piping > 3 inches subject to boiler pressure hydrostatically tested (46 CFR 61.05-10)	46 CFR 56.50-15 SOLAS 74/78 II-1/33	Oily water separating equipmentApproved equipment	33 CFR 155.380 MARPOL Ax. I/6 MSM Vol. IV
	 Lagging or insulation Hangers or supports 		Operationally tested	MSM Vol. II
	. id. igoto of oupporto		Alarms Chutdawaa	
	Fuel systems	46 CFR 56.50-65	Shutdowns	
	 Service and transfer pumps 		□ Ballast discharge	33 CFR 155.330
	Remote shutoff valves		Piping system	33 CFR 155.350 33 CFR 155.360
	Remote cutouts		• Outlet	33 CFR 155.370
	Reliefs and bypass valvesStrainers		Stop valve	MSM Vol. II
	Drip pans		Acceptable processing equipment	
	Torch pots		Pollution placard posted	33 CFR 155.450 MSM Vol. II
	PipingHeaters		Oily waste retention	MSM Vol. II
	Feedwater system (including condensate)	46 CFR 52.01-115	BilgeTank	WOW VOI. II
	• Pumps	46 CFR 56.50-35		
	Injectors Values and controls	46 CFR 56.50-45	Emission Controls	MARPOL VI
	Valves and controlsWater heaters (including deaerator)		 NOx Requirements 	CG-543 Policy Ltr 09- 01
	Water regulators		EPA engine emission stds for release in the response control of the release in the response control of the release in the response control of the release in the r	40 CFR 94 or 1042
	Water regulators Water level indicators		for vsls on intl' voyages;EIAPP Cert. issued by the EPA for vsls on intl'	46 CFR 63.25-9
	Grease extractors		voyages	
	Piping	46 CFR 56.50-30	IAPP Cert. Full and CO a Remain manufacture.	
	Gauges and thermometers	46 CFR 56.50-30	Fuel and SOx RequirementsIncinerator	
	Air ejectors		Ozone Depleting Substance	
	 Condensers 			
			Marine Sanitation Devices:	
Note	rs:		NOTE: Guidance for inspecting marine sanitation devices is a Chapter 18.K.	letailed in MSM Volume II,
			Marine sanitation device	33 CFR 159.55
			☐ Type I	MSM Vol. II
			☐ Type II	
			☐ Type III	
			Certified for inspected vessels	MSM Vol. II
			Capacity satisfactory	MSM Vol. II

	Fixed fire extinguishing system (machinery spaces) (System servicing is recorded in Hull Inspection 840 Book.) • Piping/flexible loops • Heads	46 CFR 34.15 46 CFR 34.17 46 CFR 76.15 46 CFR 76.17 46 CFR 95.05-10 SOLAS 74/78 II-2/11		• C	atic auxilia Controls and s Fuel systems Alarms Inspections/te	safety devices	46 CFR (46 CFR (46 CFR (46 CFR (63.20 63.15-3 63.15-7	
	 Alarms Markings Fire main systems and stations (machinery spaces) Required number and type, proper threads Nozzles (combination, etc.) Applicators Spanners Markings Pumps tested 	46 CFR 34.10-10 46 CFR 76.10-10 46 CFR 95.10-10		Part 59 Low pro S T A B)	s ntrols off	46 CFR :	53.05	
	 Controls and gauges Relief valves Markings Paint locker 	46 CFR 76.10-5 46 CFR 95.10-5 SOLAS 74/78 II-2/4 46 CFR 34.05-5 46 CFR Table 76.05-1(a) 46 CFR 95.05-10(c)		 Connections Refractory Periodic test and inspection of low pres heating boilers in accordance with 46 C Table 61.05-10 			Z		
Wa	tertight Integrity:	SOLAS 74/78 II-2/18.7		Boile	er Number	Date Hydrostatically Tested	Fireside	Waterside	External
	Watertight integrity of machinery spaces Watertight doors Alarms Controls Bulkheads (penetrations) Markings	46 CFR 170.270 MSM Vol. II ASTM F-1197							
Note	98:		Note	es:					

• S. • Fe • G • C	sion machinery afety devices oundations duards controls ropulsion diesels uel lines	46 CFR 58.05 SOLAS 74/78 II-1/27 46 CFR 58.05 46 CFR 58.10	General electrical installation Jury rigs Connection boxes Dead-end cables Splices Grounding Personnel safeguards (guards, rails, etc.) Hazardous locations Portable electrical equipment 46 CFR 111.01-1 SOLAS 74/78 II-1/40 46 CFR 111.60 46 CFR 111.60-17 46 CFR 111.05 46 CFR 111.30-11 46 CFR 111.105 MSM Vol. IV MSM Vol. IV
• E: - - - • L: -	Exhaust pipe Protective devices ube oil system	SOLAS 74/78 II-1/27	 Portable electrical equipment Firefighting Equipment: □ Portable extinguishers (machinery spaces) Required number, type, and class Annually serviced Bottles hydrostatically tested (every 5 years) Markings (weight and hydrostatic test date) Spare charges, spare extinguishers MSM Vol II 46 CFR 34.50 46 CFR 76.50 46 CFR 95.50 SOLAS 74/78 II-2/6 SOLAS 74/78 II-2/21 NSM Vol. II NVIC 7-70 NVIC 13-86
Gas Tu D E C A	Low lube oil High temperature Crank case xplosion covers irbine Installations tesign, construction, and materials xhaust system cooling and ventilation utomatic shutdowns uel systems ire extinguishing systems	46 CFR 58.10-15	□ Semiportable extinguishers (machinery spaces) • Required number, type, and class • Annually serviced • Bottles hydrostatically tested (every 12 years) • Controls, instructions, markings • Hose and diffuser • Flexible loops tested or replaced (same as bottle) □ Sprinkler system tested • Type • CFR 34.30 • Type • GFR 34.30 • Type • GFR 76.25 • GFR 95.30
	Reduced manning I Yes I No	46 CFR Part 62 SOLAS 74/78 II-1/46-54 MSM Vol. IV NVIC 1-69 NVIC 6-84	 Pumps Manifold Controls System diagram posted 48 CF N 93.30 MSM Vol II NFPA 13-1996 System diagram posted
• S • R • Ir	Approved test procedure Satisfactory test Reviewed logs/records Interviewed personnel Verify programmable systems/devices	46 CFR 62.50 46 CFR 62.30-10 46 CFR 62.25-25	Notes:

			<u>Pre</u>	ssu	ire Vessels	<u>:</u> :			
	 Starting system Fuel system Quarteneed trip (* 140% * 1415%) 	46 CFR 112.25 46 CFR 112.50 SOLAS 74/78 II-1/42-44	internally examined M		MSM V	CFR 61.10 SM Vol. II SM Vol. IV Relief Valy Tested CFR 54.15-10(g) CFR 56.50-50 CFR 56.50-57 CFR 58.30			
	 Overspeed trip (> 110% < 115%) Low oil pressure alarm / shutdown High jacket water temperature alarm Fixed firefighting system shutdown 				Service	MAWP	Date Tested Examined Inte		
	Emergency batteries tested	46 CFR 112.55							
	ProtectionChargerVentilation								
	Adequate emergency power and lighting	46 CFR 112.43 MSM Vol. II		_					
	Internal communications and control system								
	 General alarms Engine order telegraph Failure alarms 	46 CFR 113.25 46 CFR 113.35		Rel	lief valves spr	ings set within	range	46 CFF	R 54.15-10(g)
	 Telephones Voice tubes Public address system Pilothouse controls Fire detection and alarm systems Steering gear alarm and indicator 	46 CFR 113.30 46 CFR 113.50 46 CFR 113.10	<u>Au</u>		ary Machinge and ballast Pumps Eductors Emergency b	systems		46 CFF	R 56.50-55
-	Lifeboat electrical installation Winches and controls tested Master switch opened Limit switches opened Emergency disconnect switch opened Emergency Loads Temporary loads Final loads	46 CFR 113.43 46 CFR 111.95 MSM Vol. II 46 CFR 112.15 SOLAS II-1		Cor	Manifold, valve Remote control electric) Strainers Sounding and Markings and mpressed air and Compressor Controls and	ves, and piping rols (hydraulic, pnoduced to the control of the co	eumatic, manual,	46 CFF	₹ 58.30
			Not	es: _	Relief valves				
Note	98:								

Relief Valve

0	 Pumps Heat exchangers Valves and controls Piping Gauges, thermometers, and alarms Tanks, vents, and strainers Refrigeration and air conditioning systems Compressors Valves and controls 	46 CFR 56.50-80 46 CFR 58.20	 □ Switchboards (including emergency) • Automatic bus transfer • Ground detectors • Personnel safeguards (guards, rails, mats, etc.) • Drip shields • Nameplates • Warning notices posted • Fuse/circuit breaker ratings □ Panel boards • Overcurrent devices 	46 CFR 111.30 MSM Vol. II MSM Vol. II
	 Spare refrigerant stowage Gas mask (ammonia) with spare charges Ventilation Alarms Evaporators 	40.0ED 54.04.40	 Circuit directory Locking device Motor controllers Drip shields 	46 CFR 111.40-11 46 CFR 111.70 MSM Vol. II
	 Pumps Valves and controls Freshwater systems (potable and domestic) 	46 CFR 54.01-10	 Disconnect switch Wiring diagram posted Remote shutdowns tested Ventilation systems 	
	 Pumps Valves and controls Sump tanks Tank pressure Air cushion supply line 		 Remote shutdown tested Cargo fans Machinery space fans Accommodation fans 	46 CFR 111.103 SOLAS 74/78 II-1/48
	 Steering gear systems tested Motors and pumps Telemotor or other control Indicators and alarms Instructions and markings Final emergency power source 	46 CFR 58.25 46 CFR 61.20 46 CFR 58.25-70 46 CFR 58.25-25 33 CFR 164.34 46 CFR 58.25-65	 Ship's service lighting systems Panelboards Circuit directory Fuses Circuit breakers Berth lights 	46 CFR 111.75 46 CFR 111.40
	ectrical Systems:		Globes and guardsExplosion-proof or watertight (where required)	
	TE: Guidance for inspecting electrical systems is detailed in Ship's service generators	n NVIC 2-89.		
_	 Protective generators Protective guards Reverse power relay Overspeed trip (> 110% < 115%) Low oil pressure alarm / shutdown 	46 CFR 110.10 46 CFR 111.12 SOLAS 74/78 II-1/41 MSM Vol. II MSM Vol. IV 46 CFR 111.12-1	Notes:	
Not	tes:			